# Storm Water Management Plan

City of St. Joseph, Missouri

Prepared by:

The City of St. Joseph
And
Bartlett & West Engineers, Inc.

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## Introduction

### *Purpose and Scope*

The purpose of this Storm Water Management Plan is to develop and implement programs in order to effectively minimize storm water pollutant runoff in the various watersheds throughout St. Joseph, Missouri.

In addition to the municipal separated storm sewer system (MS4), the City of St. Joseph also has combined storm and sanitary facilities in the western portion of the City. The Belt Highway (U.S.Highway 169) serves as a general boundary between the combined and separated facilities. Overall, the combined system drains to the Missouri River, and the separated storm system drains to the 102 River. The combined sewer system watersheds are governed by the combined sewer overflow regulation. However, most of the practices contained in this manual are being implemented by the CSO watersheds as well.

### *City of St. Joseph General Information*

The City of St. Joseph is located in Buchanan County Missouri in the northwest corner of the state. Major highways through the area include Interstate 29 and U.S. Highway 36. The City is bounded by the Missouri River on the west and the 102 River on the east.

The population of St. Joseph is 73,990 (2000 census) and the area of St. Joseph is over 44 square miles. The climate for St. Joseph, Missouri is best classified as humid continental with warm summers and cool winters. Precipitation is generally evenly distributed throughout the year, but large amounts of rainfall occur in summer and fall, particularly in June and September. The average annual precipitation for St. Joseph is just over 34 inches.

Soils in the area are generally fine-grained and moderately pervious. They are classified according to the unified classification system primarily as silt loams and silty clay loams. Soils are generally classified as hydrological groups B and C according to the Natural Resource Conservation Service (formally the Soil Conservation Service).

### *Watersheds*

The St. Joseph watershed was studied in a Comprehensive Stormwater Management Plan prepared for the City in 1998. The plan did extensive investigation of the basins, including anticipated future land uses and resulting imperviousness (Table 1). An analysis of the system performance and recommended improvements was made as a part of that plan. Eighteen (18) total sub-basins were investigated in that study. This discussion of watersheds will make use of the designations set forth in that report for consistency.

The drainage basins and watersheds in St. Joseph are located primarily in northwest Buchanan County, Missouri as shown on Figure 1. The contributing area lies mostly inside the City of St. Joseph. Of the 32,250 acres within the study area, 7,805 acres were identified as being outside the city limits (1,396 acres within Andrew County). Eight

watersheds make up the basins that drain to the Missouri River. These watersheds have been developed with combined sewer systems. The remaining watersheds drain to the One Hundred and Two River on the east side of the City, and have separate sanitary sewer and storm water systems. For purposes of this report, the One Hundred and Two Watershed is considered as one watershed. The estimated imperviousness based on the anticipated development for the entire St. Joseph basin is 41%.

The following described watersheds make up the drainage basin on St Joseph's drainage maps:

*Roy's Branch Watershed*
The Roy's Branch Watershed is located in the northwest portion of the drainage basin. It lies almost entirely within Buchanan County and about 2/3 within the city limits. It covers approximately 1,670 acres between just west of Highway I-229 on the western boundary, and Maxwell Road and the Blacksnake Watershed on the east. Within this watershed, the Dewey & Highland Relief Main combined sewer systems discharge into the Missouri River. The anticipated land use in the Roy's Branch Watershed is mostly residential, park, and agriculture. The estimated impervious area for the watershed is 20 percent.

*Blacksnake Watershed*
Located in the most northerly portion of the drainage basin is the Blacksnake Watershed. About ¼ of the watershed lies in Andrew County with the balance mostly in the city limits of St. Joseph. It covers approximately 5,250 acres between Roy's Branch Watershed on the western boundary, and approximately Belt Highway on the east. The 102 River Watershed is on the east, and the Mitchell and Frederick Watersheds are on the southeast. Within this watershed, the Blacksnake and Grand Avenue combined sewer systems discharge into the Missouri River. The anticipated land use in the Blacksnake Watershed is largely residential, with substantial amounts of park and agriculture and a small amount of commercial. The estimated impervious area for the watershed is 29 percent.

*Frederick Watershed*
The Frederick Watershed is located in the central portion of the drainage basin. The watershed lies entirely within the St. Joseph city limits. It covers approximately 730 acres along Frederick Boulevard from Highway I-229 on the west to 26$^{th}$ Street on the east. The Blacksnake Watershed lies to the north and the Mitchell Watershed to the southeast. Within this watershed, the Bush Creek and Smith Branch combined sewer systems discharge into the Missouri River. The anticipated land use in the Frederick Watershed is fairly balanced between commercial, residential, and various other uses. The estimated impervious area for the watershed is 61 percent.

*Mitchell Watershed*
The Mitchell Watershed is located in the central portion of the drainage basin. The watershed lies entirely within the St. Joseph city limits. It covers approximately 3,140 acres and extends from I-229 on the west to slightly south of Mitchell Avenue and east of

the Belt Highway. The 102 River Watershed lies to the east, the Maple and Whitehead Watersheds to the south, and the Blacksnake and Frederick Watersheds to the northwest. Within this watershed, the Brookdale Creek, Brookdale Creek Relief, Main and Overhill Main combined sewer systems discharge into the Missouri River. The anticipated land use in the Mitchell Watershed is generally residential, with significant amounts of public and commercial uses. The estimated impervious area for the watershed is 49 percent.

*Maple Watershed*

The Maple Watershed is located in the west central portion of the drainage basin. The watershed lies entirely within the St. Joseph city limits. It covers approximately 430 acres centered on U.S. Highway 36 from I-229 on the west to Agency Road on the east. Mitchell Watershed is to the north, and Whitehead Watershed to the South. Within this watershed, the Duncan Street, Hickory Street and Maple Street combined sewer systems discharge into the Missouri River. The anticipated land use in the Maple Watershed is largely residential and transitional areas, with a considerable amount of industrial. The estimated impervious area for the watershed is 53 percent.

*Whitehead Watershed*

The largest and most southerly watershed in the drainage basin is the Whitehead Watershed. The watershed lies mainly within the St. Joseph city limits, with 39% lying outside the city limits. It covers approximately 8,640 acres from 2nd Street on the west to I-29 on the east and extends 2 miles south of the city limits. Maple and Mitchell Watersheds lie to the north, with 102 River Watershed to the east and Brown's Branch and Missouri Avenue Watersheds to the southwest. Within this watershed, the Maple Street Main combined sewer system discharges into the Missouri River. The anticipated land use in the Whitehead Watershed is principally residential and park land. The estimated impervious area for the watershed is 36 percent.

*Missouri Avenue Watershed*

The Missouri Avenue Watershed is located in the southwest portion of the drainage basin. The watershed lies entirely within the St. Joseph city limits. It covers approximately 610 acres including the stockyards and railroads in the western portion. Whitehead Watershed is to the east and Brown's Branch Watershed is to the south. The anticipated land use in the Missouri Avenue Watershed is comparatively balanced between residential and industrial/commercial. The estimated impervious area for the watershed is 58 percent.

*Brown's Branch Watershed*

The most southwestern watershed in the drainage basin is the Brown's Branch Watershed. The watershed lies generally within the St. Joseph city limits, with 13% lying outside the city limits. It covers approximately 2,470 acres between Purtell Street on the west and 22nd Street on the east. The watershed lies between Parker Road on the south and Mansfield Road on the north. The Missouri Avenue Watershed is to the north and the Whitehead Watershed is to the east. Within this watershed, the Brown's Branch combined sewer system discharges into the Missouri River. The anticipated land use in

the Brown's Branch Watershed is mostly residential, with a noteworthy amount of industrial. The estimated impervious area for the watershed is 41 percent.

*One Hundred and Two Watershed*

Located in the eastern half of the city is the One Hundred and Two Watershed. The total watershed covers approximately 14.5 square miles, of which 3 square miles fall outside the city limits. It lies from about I-29 and Belt Highway on the west to the One Hundred and Two River on the east. This basin extends from beyond the city limits north of Cook Road to approximately 2 miles beyond the city limits south of U.S. Highway 169. The watershed utilizes completely separate storm drain and sanitary sewer systems. All of the storm drain systems drain to the One Hundred and Two River. The separate sewer system is currently pumped westerly to the existing treatment plant on the Missouri River. The anticipated land use in the One Hundred and Two Watershed is about one-half residential, with considerable amounts of industrial in the southerly basins H, J, K and L. Large public and quasi-public areas are found in the central basins F, G, and H. Basin A is highly agricultural. Park and Commercial uses are scattered throughout the watershed. The overall impervious area for the watershed is estimated at 49 percent.

**Table 1: Future Land Uses and Imperviousness**

| Watershed Name | Total Area (Acres) | Low Density Residential | Multi-Family Residential | Office | Commercial | Industrial | Historic Districts | Quasi-Public | Public | Parks | Transition Areas | Agriculture | Imperviousness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| Roy's Branch | 1,667 | 43% | 0% | 0% | 0% | 2% | 0% | 0% | 1% | 32% | 0% | 22% | 20% |
| Blacksnake | 5,254 | 57% | 0% | 0% | 5% | 1% | 0% | 2% | 2% | 12% | 1% | 20% | 29% |
| Frederick | 733 | 24% | 0% | 0% | 25% | 14% | 9% | 6% | 6% | 2% | 14% | 0% | 61% |
| Mitchell | 3,143 | 52% | 1% | 1% | 13% | 2% | 0% | 2% | 14% | 9% | 6% | 0% | 49% |
| Maple | 429 | 49% | 0% | 0% | 0% | 24% | 0% | 0% | 0% | 0% | 27% | 0% | 53% |
| Whitehead | 8,637 | 66% | 4% | 0% | 4% | 5% | 0% | 0% | 1% | 20% | 0% | 0% | 36% |
| Missouri Ave | 612 | 47% | 6% | 0% | 6% | 38% | 0% | 1% | 2% | 0% | 0% | 0% | 58% |
| Brown's Branch | 2,470 | 69% | 0% | 0% | 2% | 14% | 0% | 0% | 3% | 12% | 0% | 0% | 41% |
| 102-A | 174 | 21% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 19% | 0% | 60% | 9% |
| 102-B | 829 | 59% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 37% | 0% | 4% | 24% |
| 102-C/D | 1,921 | 55% | 14% | 0% | 11% | 2% | 0% | 5% | 0% | 7% | 0% | 6% | 41% |
| 102-E | 561 | 79% | 0% | 0% | 8% | 0% | 0% | 4% | 0% | 7% | 0% | 2% | 37% |
| 102-F | 62 | 32% | 0% | 0% | 2% | 0% | 0% | 29% | 0% | 37% | 0% | 0% | 19% |
| 102-G | 1,153 | 19% | 14% | 0% | 12% | 0% | 0% | 0% | 51% | 4% | 0% | 0% | 65% |
| 102-H | 726 | 20% | 0% | 22% | 0% | 24% | 0% | 0% | 29% | 5% | 0% | 0% | 67% |
| 102-J | 189 | 16% | 0% | 17% | 13% | 25% | 0% | 5% | 0% | 24% | 0% | 0% | 55% |
| 102-K | 318 | 50% | 0% | 0% | 0% | 17% | 0% | 0% | 0% | 33% | 0% | 0% | 35% |
| 102-L | 3,349 | 50% | 1% | 0% | 0% | 47% | 0% | 0% | 2% | 0% | 0% | 0% | 56% |
| Entire Study Area | 32,227 | 55% | 3% | 1% | 5% | 10% | 0% | 1% | 5% | 13% | 1% | 5% | 41% |

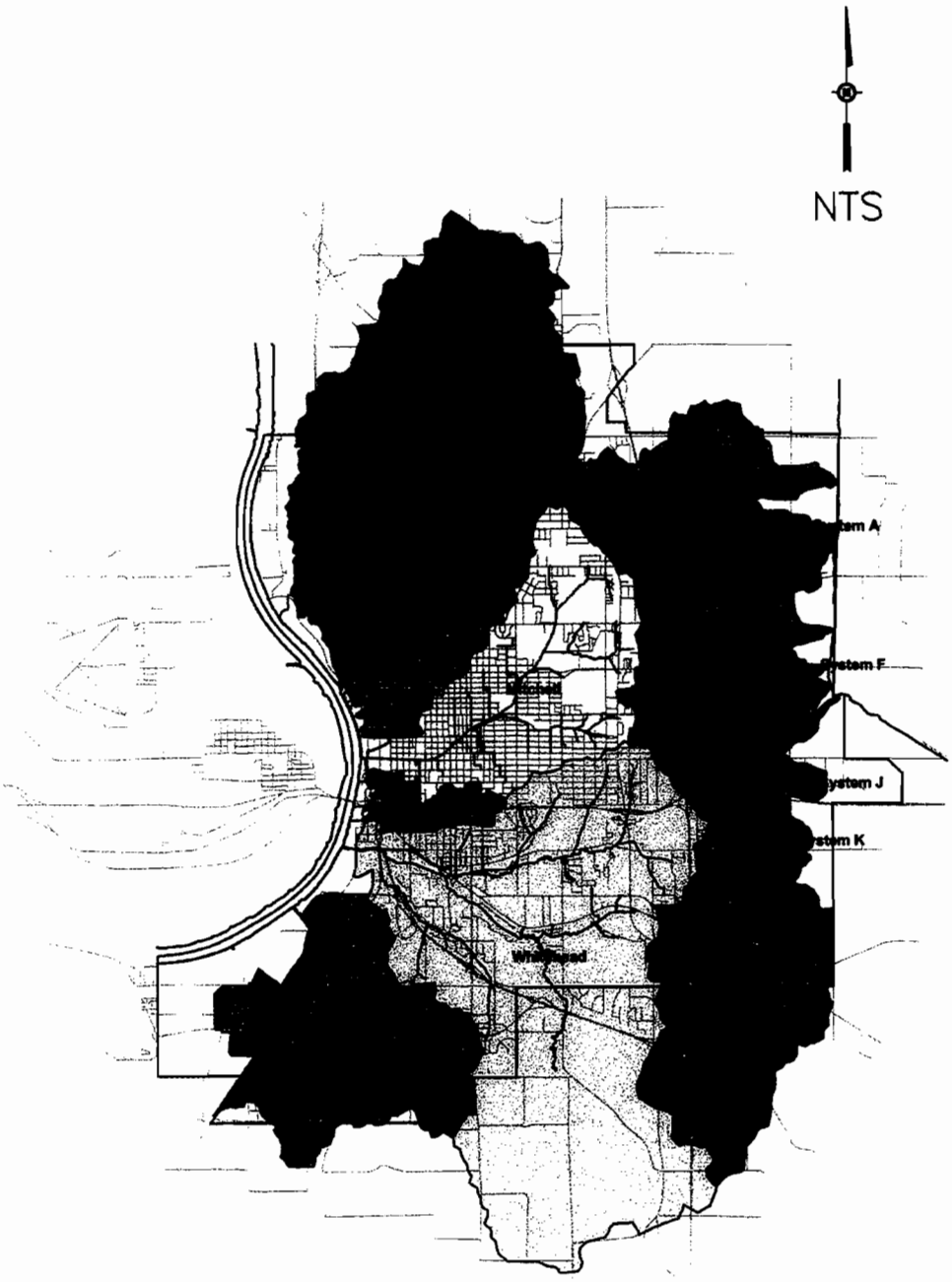


**Figure 1: City of St. Joseph Watershed Map**

***303d Listed Waters***

The Missouri River was included on the Clean Water Commission approved 303d 2004 listing for chlordane and polychlorinated biphenyls (PCB) in fish. Prior to 2001 the Missouri Department of Health and Senior Services maintained a fish consumption advisory on all waters in the state outside the Ozark Plateau. This advisory, which included the Missouri and Mississippi Rivers, recommended consumption of no more than one meal per weak of carp, catfish, buffalo, drum, sucker or paddlefish due to chlorinated hydrocarbon pesticides such as dieldrin, chlordane, and DDT. This advisory was lifted in 2001 due to declining levels of these chemicals in most fish species. This advisory was replaced by the current advisory (2004) for the Missouri and Mississippi Rivers which recommends that no sturgeon or sturgeon eggs should be eaten due to elevated levels of chlordane and PCBs.

Chlordane is a pesticide that was commonly used in the past for termite control. It was also used at nurseries, on golf course, and in agriculture. Chlordane was banned for agricultural use in 1975 and for all uses in 1988, but (due to its persistence) eroding contaminated soil can provide a continuing source of chlordane to streams and lakes. PCBs are a mixture of up to 200 different chlorinated compounds and are stable under conditions of high pressure and high temperature. PCBs were commonly used in transformers and other electrical equipment such as fluorescent light fixtures as coolants and lubricants and were also used as hydraulic oils. U.S. production ended in 1977 due to concerns about the persistence of PCBs in the environment. Chlordane and PCBs degrade very slowly and bio-accumulate in fish tissue, particularly in bottom-dwelling/feeding fish.

Discharges into the Missouri River from the City of St. Joseph are from the combined sewer system. These discharges are regulated by other permits, and should address the 303(d) listing. However, best management practices in place for Minimum Control 4 – Construction Site Storm Water Runoff Control will minimize the amount of eroded soil leaving construction sites.

Permit modification may be necessary to address these pollutants, as well as any future pollutant addition to the 303(d) listing.

***Preparation of Application***

On March 17, 2004, the City of St. Joseph submitted an application for the Phase II permit, as well as a draft Storm Water Management Plan, to the Missouri Department of Natural Resources (MDNR). The draft plan documented existing practices and policies, and identified areas which would be developed during the intense program development phase. The permit was approved by MDNR on April 16, 2004.

The City of St. Joseph then retained Bartlett and West Engineers to assist the City in the intense development program phase. First, the Storm Water Public Advisory Committee was formed from various stakeholders in the community. Each minimum control was presented and discussed with the storm water committee. The meeting materials were developed from extensive research on current policies and practices within the City of St.

Joseph, the EPA Compliance Assistance Guide, and example Best Management Practices (BMPs) from other communities. The committee then made recommendations which led to the development of the BMPs for the City of St. Joseph.

## Minimum Control 1 – Public Education and Outreach on Storm Water Impacts

***Permit Requirement***

The Missouri Department of Natural Resources general permit for discharges from regulated small MS4s requires the City of St. Joseph to implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff.

***Decision Process***

During the development of this storm water management plan several existing outlets were identified to provide public education and outreach on storm water impacts. They include regular school tours of the Waste Water Treatment Plant, the City of St. Joseph Website, household hazardous waste collections, the clean sweep program (residents may utilize the municipal landfill free of charge for two days per year), sewer bill stuffers, and a bi-annual American Public Works Week open house.

However, the City does not have any specific materials or strategies to educate the public on storm water impacts through these existing outlets. Potential educational materials, as well as target pollutants and audiences, will be determined during the public involvement process in an effort to tailor the program specifically to the needs of the community.

***Public Involvement***

On November 9, 2004, the Storm Water Public Advisory Committee met to discuss public education and outreach on storm water impacts. In general, the committee felt the education is a long term process and should start with the children to have the most effective long term impact on storm water pollution prevention. However, they suggested that the City's educational program should target groups other than children.

Existing City outreach and educational outlets were discussed as well as educational programs provided by the school district and Missouri Western State University. The local school district is about to raise the science credit requirements for incoming freshman and is currently applying for a grant to support the establishment of an environmental science program. The Missouri Department of Conservation provides a full time naturalist on the campus of Missouri Western to provide educational programs.

Next, the committee was asked to prioritize a listing of pollutants to address in the public educational process. A value of three (3) indicates a high priority and a value of one (1) indicates a low priority. The committee indicated the top four pollutants were oil and grease, metals, paint solvents/cleaners, and sediment/suspended solids. The full results are presented in Table 2.

**Table 2: Pollutant Priority**

| Pollutant | Priority |
|---|---|
| Oil and grease | 2.7 |
| Metals | 2.4 |
| Paint solvents/cleaners | 2.4 |
| Sediment/suspended solids | 2.3 |
| Pesticides | 2.2 |
| Nutrients | 2.0 |
| Floatables/litter | 2.0 |
| Salt | 1.8 |
| Organic Matter | 1.7 |
| Bacteria | 1.6 |
| Temperature | 1.1 |

The committee was also asked to prioritize the target audiences in a similar fashion. The committee's rankings showed that the educational program should target industries and home owners specifically. The full results are listed below in Table 3.

**Table 3: Target Audiences**

| Audience | Priority |
|---|---|
| Industry | 2.2 |
| Residents | 2.2 |
| General Public | 2.0 |
| Children | 1.7 |
| Commercial/Business | 1.1 |
| New Development/ Developers/Builders | 1.1 |

Finally, the Storm Water Public Advisory Committee brainstormed other educational and outreach strategies the City could use to provide education on storm water impacts. The suggestions fell into five categories which are presented below.

**Household Hazardous Waste Collection**

- Provide more education on the availability of the program
- Provide more collection times per year or make it permanently available

**Schools**

- Investigate a partnership between the City of St. Joseph, the St. Joseph School District, and Missouri Western State University.
- Provide City staff and resources to promote education of environmental, ecological issues, etc.

**Brochures**

- Develop a storm water pollution educational brochure and make it available at local banks, Doctor's offices, tax collection windows, the Educational Center at Missouri Western, etc.
- Develop the brochure recommended for Minimum Control 4 addressing construction site runoff control
- Support booths at the Farm Show, Home Show

**Giveaways**

- Provide giveaways including refrigerator magnets and/or placemats which present a succinct message on storm water pollution

**Media Relations**

- Utilize television, radio, and cable television programs to increase storm water pollution awareness
- Provide press releases highlighting positive influences and successful storm water pollution prevention projects
- Create a Community Appearance Award for residents in conjunction with the Community Appearance Plan
- Utilize the City's website to promote the Storm Water Management Plan

***Best Management Practices and Measurable Goals***

**Table 4: BMPs and Goals for Minimum Control 1**

| Best Management Practice | Measurable Goal | Implementation |
|---|---|---|
| **Household Hazardous Waste Collection** – *to provide residents with education on the importance of proper disposal of household hazardous waste and the availability of the program (in conjunction with Minimum Control 3)* | • Provide at least two (2) collections per year<br>• Issue press releases to media on availability<br>• Investigate providing collection program on a year round basis at municipal landfill | In Place<br>In Place<br>Partially In Place: Oil, antifreeze and fluorescent bulbs |

| | | |
|---|---|---|
| **Schools** – *to promote education of environmental and ecological issues including storm water pollution* | • Provide at least three (3) public speaking appearances to schools per year<br>• Investigate potential partnerships with school district and Missouri Western State University to provide educational materials and resources | In Progress<br><br>January 2008 |
| **Brochures** – *to educate public on the impacts of storm water pollution* | • Develop and provide brochures each year to local businesses<br>• Develop and provide brochures addressing construction site storm water runoff each year to local hardware stores, home improvement, and lawn and garden centers (in conjunction with Minimum Control 4) | January 2008<br><br>January 2008 |
| **Giveaways** – *to provide a succinct message on the impacts of storm water pollution* | • Develop and distribute giveaways | January 2008 |
| **Media Relations** – *to utilize media to educate residents and promote storm water pollution prevention* | • Generate at least five (5) articles per year for various publications.<br>• Promote Storm Water Management Plan on City website | In Progress<br><br>In Progress |

***Person Responsible for Overall Management and Implementation***
The Director of Public Works shall be responsible for the overall management and implementation of this minimum control.

## Minimum Control 2 – Public Involvement/Participation

***Permit Requirement***
The Missouri Department of Natural Resources general permit for discharges from regulated small MS4s requires the City of St. Joseph to develop and implement a public involvement and participation program that complies with State and local public notice requirements.

***Decision Process***
The City of St. Joseph impaneled the Storm Water Public Advisory Committee to actively participate in the development of the Storm Water Management Plan and application for the Phase II permit. The Storm Water Public Advisory Committee consisted of several members specifically chosen to represent all potential stakeholder groups, such as residents, industry, business, education, development, etc. The committee met four times to discuss each minimum control and suggest potential best management practices which reflected the unique character of the community.

***Public Involvement***
On November 30, 2004, the Storm Water Public Advisory Committee met to discuss public involvement during the implementation of the storm water management plan. In general, the committee felt that public involvement in storm water pollution issues is necessary for the future success of the program. The committee's ideas fell into two general categories, community wide and localized involvement strategies.

As a community, the committee suggested an attitude survey be conducted to gauge the community's education and attitude on storm water pollution related issues. They also suggest further public hearings on the Storm Water Management Plan, as well as a continued committee charged with an annual or semi-annual review. Finally, the committee suggested providing community service groups with storm water impact project ideas. This type of outreach can lead to many valuable partnering opportunities for the City.

Localized involvement strategies included a stream team or "Adopt-a-Stream" type program on a watershed basis. However the City does not have easements on a majority of the streams, therefore the extent of this program may be limited due to legal and liability issues. It was further suggested to survey and monitor all the watersheds to identify the critical areas. A critical area would then be selected and used as the model for the "Adopt-a-Stream" program. A well publicized success could very well lead to additional stream clean up programs.

As the public involvement discussion evolved, many additional educational strategies were identified. These have been included on Minimum Control 1 – Public Education and Outreach.

***Best Management Practices and Measurable Goals***

**Table 5: BMPs and Goals for Minimum Control 2**

| Best Management Practice | Measurable Goal | Implementation |
|---|---|---|
| **Storm Water Public Advisory Committee** – *to involve residents in the development of the Storm Water Management Plan* | • Discuss each minimum control with the committee<br>• Incorporate their suggestions and comments into the Storm Water Management Plan | Completed<br><br>In Progress |
| **Community Wide Involvement** – *to promote involvement in the implementation of the Storm Water Management Plan* | • Establish a committee to assess progress and direction at permit renewal | January 2008 |
| | | |

***Person Responsible for Overall Management and Implementation***

The Director of Public Works shall be responsible for the overall management and implementation of this minimum control.

## Minimum Control 3 – Illicit Discharge Detection and Elimination

***Permit Requirement***

The Missouri Department of Natural Resources general permit for discharges from regulated small MS4s requires the City of St. Joseph to satisfy the following requirements:

- develop, implement and enforce a program to detect and eliminate illicit discharges into the City's regulated small MS4
- create a storm sewer map showing the location of all the outlets and names and location of all outlets and the names and location of all waters of the State that receive discharges from those outlets
- prohibit through ordinance, non-storm water discharges into the City's storm sewer system and implement appropriate enforcement actions
- develop and implement a plan to detect and address non-storm water discharges, including illegal dumping
- educate public employees, businesses, and the general public of the hazards associated with illegal discharges and improper disposal of waste

The City is also required to address the following categories of non-storm water discharges or flows only if the City identifies them as significant contributors of pollutants to the City's regulated small MS4:

- landscape irrigation
- rising ground waters
- uncontaminated pumped ground water infiltration
- uncontaminated pumped ground water
- discharges from potable water sources
- foundation drains
- air conditioning condensation
- springs
- water from crawl space pumps
- footing drains
- lawn watering
- flows from riparian habitats and wetlands
- street wash water

The City may also develop a list of other similar occasional incidental non-storm water discharges that will not be addressed as illicit discharges. These non-storm water discharges shall not be reasonably expected to be significant sources of pollutants to the MS4, because of either the nature of the discharges or conditions the City has established for allowing these discharges to the MS4. The City shall document in their storm water management plan any local controls or conditions placed on the discharges. The City shall include a provision prohibiting any individual non-storm water discharge that is determined to be contributing significant amounts of pollution to the MS4.

***Decision Process***

A dynamic storm sewer model was developed in 1999 for the City of St. Joseph. Pipes over 24" in diameter and natural streams are included in the model. Paper maps are used to depict the system. The City is in the process of updating the aerial photography and contours, as well as developing layers for the geographical information system. The storm system will be installed beginning in 2009.

There are two sections of the Code of Ordinances which cover illicit discharges. Sections 29-162 and 24-1 through 24-4 prohibit the discharge of polluted waters and solid wastes into any storm sewer or natural outlet. As part of code enforcement, the City can forcefully stop the illicit discharge. Some violations can carry a misdemeanor charge.

Currently, illicit discharges are detected during yearly maintenance of the storm water inlets and in response to citizen complaints. Maintenance of the storm water inlets only occurs in dry weather, thus resulting in dry weather screening. If discharge is detected during dry weather, it is chemically analyzed to determine a possible source. The City may also utilize smoke testing or a TV camera capable of traveling up the storm sewer piping to trace the discharge to its source.

Once the source of the discharge is located, it is disconnected in accordance with City Ordinance.

Refer to the Best Management Practices and Measurable Goals section for methods of program evaluation and assessment.

Public education and outreach strategies for illicit discharges were discussed in depth during the Storm Water Public Advisory Committee meeting. Refer to the Public Involvement section for more information.

***Public Involvement***

On November 30, 2004, the Storm Water Public Advisory Committee met to discuss illicit discharge detection and elimination. In general, the discussion focused on different methods of educating the public in regards to illicit discharges.

The committee felt regulation was not needed for any of the excepted non-storm water discharges. However, they suggested public education for residents regarding: car washing, impacts of swimming pool water discharges, and proper disposal of household hazardous waste.

In addition, the committee also suggested these public education strategies:

- Providing information on the City's web site and cable channel
- Sampling of storm water and making the results available to the public
- Utilizing the City's laboratory resources to analyze storm water samples
- Furthering awareness among city maintenance staff

These strategies will be woven into Minimum Control 1 – Public Education and Outreach and Minimum Control 6 – Good Housekeeping/Pollution Prevention for Municipal Operations.

Finally, the committee offered the following ideas concerning illicit discharge detection and elimination:

- Greater access to household hazardous waste opportunities
- Smoke testing programs on the sanitary sewer system to find cross connections
- Use of video cameras in storm and sanitary lines
- Increased maintenance (root cutting, flushing, and vacuuming) of sanitary sewers prone to back up.

The City of St. Joseph utilizes many of these ideas already in their maintenance program. However, household hazardous waste was a reoccurring theme throughout the storm water management plan development. Further considerations will be made for additional hazardous waste pickups in conjunction with Minimum Control 1.

***Best Management Practices and Measurable Goals***

**Table 6: BMPs and Goals for Minimum Control 3**

| Best Management Practice | Measurable Goal | Implementation |
|---|---|---|
| **Storm Sewer System Mapping** – *to indicate the location of outlets and natural channels to assist in dry weather screening* | • Develop electronic map of storm sewer system<br>• Ongoing visual inspection of storm outfalls maintenance, projects and non-peak times | Completed<br>In Progress |
| **Ordinance** – *to prohibit illicit discharges through ordinance as well as establishing enforcement procedures* | • Develop an ordinance prohibiting illicit discharges and the penalties for causing such discharges | Completed |
| **Detection and Elimination of Illicit Discharges** – *to develop a program to detect illicit discharges to the MS4 and eliminate them* | • Document suspicious wet flows during yearly maintenance of inlet (dry weather screening)<br>• Document number of illicit discharge sources identified and eliminations of such discharges | October, 2007<br>January, 2008 |

| | | |
|---|---|---|
| **Education** – *to increase public awareness of the hazards of illicit discharges* | • Develop education brochure in conjunction with Minimum Control 1 | January 2008 |

***Person Responsible for Overall Management and Implementation***
The Director of Public Works shall be responsible for the overall management and implementation of this minimum control.

## Minimum Control 4 – Construction Site Storm Water Runoff Control

***Permit Requirement***

The Missouri Department of Natural Resources general permit for discharges from regulated small MS4s requires the City of St. Joseph to develop, implement, and enforce a program to reduce pollutants in any storm water runoff to their regulated small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activities disturbing less than one acre shall be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. At a minimum, the City's program shall include the development and implementation of the following:

- An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under state or local law;
- Requirements for construction site operators to implement appropriate erosion and sediment control best management practices;
- Requirements for construction site operators to control waste such as discarded building materials, concrete truck wash out, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;
- Procedures for site plan review which incorporate consideration of potential water quality impacts;
- Procedures for site inspection and enforcement of control measures.

***Decision Process***

The City of St. Joseph has previously promulgated an erosion control policy which requires a soil erosion plan for land disturbing construction activities. The purpose of the plan is to clearly establish what measures will be taken to prevent erosion and off site sedimentation during and after development. The erosion control policy for the City of St. Joseph can be found in Appendix A. Erosion and sediment control measures must be designed to provide protection pursuant to the City's storm water policy and the standards contained in the most current version of *Protecting Water Quality, A Field Guide to Erosion, Sediment and Stormwater Best Management Practices for Development Sites in Missouri and Kansas,* November 1995.

According to the erosion control policy, land disturbance activities of 1,000 square feet or greater require a land disturbance permit. The permit requires the development of a site grading and drainage plan and a narrative describing the nature and scope of the work. The plan provides existing topography and waterway features over the entire drainage basin. It also will show the proposed alterations, along with limits of cut and fill, proposed drainage facilities, and site improvements. In addition, the plan is required to show temporary erosion and sediment control measures during active construction in accordance with the City's policy. Finally, the plan is required to show the permanent erosion and sediment controls for long term protection in accordance with the City's storm water management policy.

The permit application is reviewed by permit clerks and inspected by the Building Code division. Significant land disturbance activities such as commercial and full subdivision developments are reviewed by the Development Review Committee. The Development Review Committee is composed of members from regulatory divisions of the City including Health, Fire, Building Code, Water Pollution Control, and Engineering divisions. One purpose of the review process is to determine if the proposed erosion and sediment control measures are in compliance with the City's erosion control policy.

A permit for grading or constructing any public street will not be issued until the temporary erosion control measures set forth in the site grading and drainage plan have been properly installed. The plan also states that all surfaces must be stable and non-erosive within the lesser of thirty (30) working days or ninety (90) calendar days after final completion of the work authorized by the land disturbance permit. When such work is associated with the construction of a building, no certificate of occupancy shall be issued until such surfaces are stable and non-erosive. If completion of the work or building is at such time of the year that stabilization with ground cover is not possible, a performance bond or other acceptable financial instrument for completion of the work may be accepted to allow the issuance of a certificate of occupancy.

The erosion control policy also addresses the issue of waste and material management and disposal. According to the policy, all waste and unused building materials shall be properly managed and disposed of to prevent pollutants and debris from being carried offsite by runoff. In addition to the policy, the City's Code of Ordinances also addresses construction and building wastes. Section 25 of the Code of Ordinances defines construction and building waste as a solid waste, and thereby requires it to be properly disposed offsite.

Inspection of the sediment and erosion control measures is dependant upon the scope and size of the land disturbance activity. Building Code division staff members inspect smaller land disturbance activity measures, whereas larger developments and commercial sites are inspected by a staff member of the Engineering division. The inspectors insure the property application and maintenance of the proposed measures and have the authority to cause correction if necessary. Sanctions include a fine of $500 per day until the violation is corrected, stop work orders, or refusal to issue additional building permits on large multi phase projects.

At the present time, public comment concerning construction site storm water runoff is limited to individual complaints to the Engineering division staff or during the public comment portion of the Planning and Zoning Commission meetings. The City does not have a formal procedure for receiving and tracking public information.

***Public Involvement***

On October 26, 2004, the Storm Water Public Advisory Committee met to discuss construction site storm water runoff. In general, the committee felt the City needed to

address contractor education and training, public education, and procedures for handling public comments concerning construction site storm water runoff control.

The committee felt contractors would benefit from programs designed to educate them on the importance of erosion and sediment control, as well as training on how to properly maintain and install sediment and erosion controls. It was suggested that training could be provided through organizations such as the Home Builders Association, Association of General Contractors, or the local unions. Physical observation/sampling during storm events was also suggested to provide a benchmark of the effectiveness of the erosion and sediment controls.

They also recommended providing an educational brochure to contractors and private individuals for any land disturbance permit application. The brochure could also be available at local hardware, home improvement, and lawn and garden centers. The brochure would provide illustrations and examples of proper erosion and sediment control. It could also provide information on where to purchase erosion and sediment control materials.

Finally, the committee suggested some type of water quality/storm water hotline which would give residents an opportunity to express comments concerning construction site storm water runoff. The hotline could be tied into a tracking system, insuring all comments and complaints are addressed accordingly.

### *Best Management Practices and Measurable Goals*

**Table 7: BMPs and Goals for Minimum Control 4**

| Best Management Practice | Measurable Goal | Implementation Schedule |
|---|---|---|
| **Erosion Control Policy** – *to clearly establish what measures will be taken to prevent erosion and off site sediment during and after development* | • Document number of land disturbance permits issued each year | In Place |
| **Sanctions** – *to establish a system of sanctions that are uniformly applied to all violations* | • 100% of permitted land disturbances inspected<br>• Document occurrence and severity of sanctions with goal of reducing occurrences from year to year | In Place<br><br>In Progress |

| | | |
|---|---|---|
| **Contractor Education** – *to educate contractors of the importance of erosion and sediment control, as well as proper installation and maintenance procedures* | • Provide annual training seminar for contractors and City inspectors | January 2008 |
| **Public Education** – *to educate the general of the importance of erosion and sediment control, as well as provide potential sources to obtain temporary erosion products* | • Develop and provide brochures each year to local hardware stores, home improvement, and lawn and garden centers (in conjunction with Minimum Control 1) | January 2008 |
| **Water Quality/Storm Water Hotline** – *to provide the public an avenue to provide input on water quality/storm water* | • Document number of calls received | January, 2008 |

***Person Responsible for Overall Management and Implementation***
The Director of Public Works shall be responsible for the overall management and implementation of this minimum control.

## Minimum Control 5 – Post-Construction Storm Water Management in New Development and Redevelopment

***Permit Requirement***

The Missouri Department of Natural Resources general permit for discharges from regulated small MS4s requires the City of St. Joseph to develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are a part of a larger common plan of development or sale, that discharge into the City's regulated small MS4. The City's program shall ensure that controls are in place that would prevent or minimize water quality impacts including:

- The development and implementation of strategies which include a combination of structural and/or non-structural best management practices appropriate for the community
- An ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable
- Assurance of adequate long-term operation and maintenance of the best management practices

***Decision Process***

The City of St. Joseph maintains and enforces a storm water management policy for new development and redevelopment areas. The policy requires the post construction storm water runoff to be equal to and, in may cases, less than the pre-developed conditions. Priority areas of management include commercial related developments and subdivisions. In some cases, the plan allows for a financial contribution towards a regional detention basin in lieu of constructing a smaller site specific basin. The storm water management policy can be found in Appendix B.

The policy is tailored to the community by allowing a wide range of structural best management practices to be utilized. It also encourages the use of existing waterways or natural detention areas. The policy also requires development layout such that the overland flow velocity is minimized to provide a greater opportunity for infiltration. This reflects the City's desire to create "soft" best management practices instead of the minimum dry detention basin.

The storm water management policy was promulgated as a rule in accordance with the City Code of Ordinances. The policy requires the owner or agent of the development to be responsible for the maintenance of the best management practices, and allows the City the ability to levy tax assessments against the owners and properties utilizing the facilities.

The City currently has a policy developed in 2006 to provide incentives such as tax abatements and other financial incentives for redevelopment projects in the urban core. The City is also utilizing a Community Development Block Grant for developing a large downtown brownfield area.

A landscaping ordinance is also being developed. This ordinance was adopted by Council in 2005. The landscaping ordinance will require a minimum percentage of pervious surface in all new or redevelopment areas. The City also provides semi-annual household hazardous waste collections as a source control measure.

***Public Involvement***

On November 9, 2004, the Storm Water Public Advisory Committee met to discuss post-construction storm water management in new development or redevelopment. In general, the committee felt the existing storm water management policy is successful in controlling the quantity of additional storm water runoff from new development or redevelopment. However, they felt quality of the storm water runoff needs to be addressed.

They felt the storm water management policy should be modified to include controls for the quality of storm water runoff as opposed to only the quantity of runoff. They suggested the following changes:

- Use landscaping for filtering and infiltration, bioretention
- Gas and oil controls for gas stations and large parking lots
- Manufactured products for storm water inlets and systems
- Storm water quality controls should be designed for higher frequency storms to maximize pollution removals
- Provide better design standards and reviews for developers
- Increase maintenance and enforcement of best management practices

They also suggested changes to Planning and Zoning Ordinances to improve storm water quality in new development and redevelopment areas. The following changes were suggested:

- Support and encourage low impact development
- Require more green space and walking trails in subdivisions
- Require buffer zones along natural waterways

The committee gave their support to the City in their efforts to develop a regional detention basin for the Black Snake Creek Watershed. They recommended the City investigate the possibility of providing other regional detention basins on other watersheds using Missouri Department of Conservation funds.

Finally, the committee requested the City to review their deicing practices during the winter in an effort to reduce pollution caused by sand and salt. Minimum Control 6 will explore this recommendation in more detail.

***Best Management Practices and Measurable Goals***

**Table 8: BMPs and Goals for Minimum Control 5**

| Best Management Practice | Measurable Goal | Implementation |
|---|---|---|
| **Storm Water Management Policy** – *to minimize and/or prevent water quality impacts from new development and redevelopment by using structural best management practices* | • Storm water management policy<br>• Revise storm water management policy to better address quality issues | In Place<br>2008 |
| **Planning and Zoning** – *to minimize and/or prevent water quality impacts from new development and redevelopment by using non-structural best management practices* | • Develop policy to encourage urban core development<br>• Develop landscaping ordinance<br>• Suggest revisions to the Planning and Zoning Ordinances regarding committee recommendations | In Place<br>In Place<br>March 2008 |
| **Regional Detention Ponds** – *to minimize and/or prevent water quality impacts from existing development or smaller developments where detention basins are impractical* | • Black Snake Creek Watershed regional detention basin<br>• Investigate other funding sources for additional regional basins<br>• Create action plan for the development of future regional basins | In Progress<br>In Progress<br>In Progress |
| **Deicing Practices** – *to minimize and/or prevent water quality impacts from municipal deicing practices* | • Refer to Minimum Control 6 – Pollution Prevention/Good Housekeeping for Municipal Operations | |
| **Developer Education** – *to educate developers on the impacts of storm water pollution and prevention methods* | • Developer education is addressed in Minimum Control 1 – Public Education and Outreach on Storm Water Impacts | |

***Person Responsible for Overall Management and Implementation***
The Director of Public Works shall be responsible for the overall management and implementation of this minimum control.

## Minimum Control 6 – Pollution Prevention/Good Housekeeping for Municipal Operations

***Permit Requirement***

The Missouri Department of Natural Resources general permit for discharges from regulated small MS4s requires the City of St. Joseph to develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations. The City should use training materials available from the EPA, State, or other organization. The City shall also develop a training program to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.

***Decision Process***

The City of St. Joseph currently has several outdated and incomplete overall Operations and Maintenance Manuals. During the public involvement process, revisions to the manual were recommended by the Storm Water Public Advisory Committee. These revisions will focus on training programs and will be presented in more detail further in this section.

A list of other industrial facilities the City of St. Joseph operates, which are subject to individual NPDES permits for discharges of storm water are as follows:

- City of St. Joseph Landfill MO0109878
- City of St. Joseph WWTP MO0023043
- City of St. Joseph WWTP Rosecrans MO0023051
- City of St. Joseph Rosecrans Memorial Airport MO0118656

As mentioned above, the Storm Water Public Advisory Committee recommended revisions to the City's overall Operations and Maintenance Manual. The revisions should include specific pollution prevention/good housekeeping training programs in the following areas:

- Hazardous material storage, handling, and spill procedures
- Landscaping, lawn care, park and open space maintenance
- Vehicle maintenance
- Street, parking lot, and storm sewer system cleaning
- Snow removal

Training programs for these categories currently exist in many of the City Departments. An important recommendation is to develop specific pollution prevention/good housekeeping training programs which would supplement existing training programs. These supplemental training programs should be coordinated with other minimum controls, especially public education and outreach.

The City of St. Joseph maintains and operates three full time street sweepers. The City also has a storm water inlet inspection, cleaning and maintenance schedule. On average, each street is cleaned four times per year and inlets are cleaned once per year. Some higher priority streets, such as the downtown area, are cleaned more frequently or even weekly. The municipal parking lots and garages are also cleaned when needed, but not on a set schedule. These cleaning and maintenance activities reduce floatables and other pollutants in the MS4 system. All of the waste material collected is disposed of properly at the City's solid waste landfill.

The City stores ice and snow removal materials inside. While salt is still used, it is treated with a totally organic material (de-sugared sugar-beet molasses) which reduces the corrosiveness of the salt. The City also closely watches the amount of salt placed, trying to not use more than necessary.

***Public Involvement***

On December 14, 2004, the Storm Water Public Advisory Committee met to discuss pollution prevention/good housekeeping for municipal operations. In general, the committee recommended revisions to the existing overall operations and maintenance manual for the City. The revisions to the manual would cover the necessary training programs, as well as materials necessary for pollution prevention/good housekeeping.

The committee felt the City training programs should be included as part of the public education minimum control. They asked the City to coordinate the pollution prevention training with industry, education institutions, and local golf courses. The City should promote the local Extension office as a resource, as they teach a landowner pesticide certification program. By and large, the committee felt the City should "set the example" on pollution prevention practices.

Next, street sweeping frequency was discussed by the committee. The committee felt the east side of the City should be a priority as this is the part of the City with the separate storm water system. They also recommended reducing salt application rates during snow and ice storms. Lastly, the committee recommended sweeping and cleaning of the municipal parking lots and garages on a set schedule.

Storm sewer inlet cleaning and maintenance was the final topic of discussion. Again, the committee felt it was important to prioritize the east side of the City. The committee also recommended a complete inventory of the inlets, including an indication of which inlets are requiring increasing maintenance.

***Best Management Practices and Measurable Goals***

**Table 9: BMPs and Goals for Minimum Control 6**

| Best Management Practice | Measurable Goal | Implementation |
|---|---|---|
| **Training** – *to educate employees about specific pollution prevention/good housekeeping methods* | • Revise general training materials to include specific storm water pollution training and education<br>• Provide joint training programs between City and industry representatives each year | January 2008<br><br>January 2008 |
| **Street Sweeping** – *to reduce the amount of floatables and other pollutants entering the MS4 and reduce future maintenance costs* | • Maintain street sweeping log with the goal of sweeping each street with a frequency necessary to reduce/eliminate gutter deposits | In Place |
| **Parking Lot and Garage Sweeping** – *to reduce the amount of floatables and other pollutants entering the MS4 and future maintenance costs* | • Maintain parking lot and garage sweeping log with the goal of sweeping each facility as needed | In Place |
| **Inlet Inspection, Cleaning and Maintenance** – *to reduce the amount of floatables and other pollutants entering the MS4 and reduce future maintenance costs* | • Maintain inlet inspection, cleaning, and maintenance log with the goal of inspecting, cleaning, and maintaining each inlet a minimum of one (1) time per year | In Place |
| **Snow and Ice Removal** – *to reduce the amount of salt used to treat roadways during winter weather events* | • Chart annual amount of salt used per year vs. winter weather frequency | In Place |

***Person Responsible for Overall Management and Implementation***

The Director of Public Works shall be responsible for the overall management and implementation of this minimum control.

## Summary

The purpose of this Storm Water Management Plan is to develop and implement programs in order to effectively minimize storm water pollutant runoff in the various watersheds throughout St. Joseph, Missouri. The Storm Water Public Advisory Committee was heavily involved in the development of the best management practices for each minimum control. A summary of each minimum control appears in Table 10.

It is acknowledged that revisions will be made to this Storm Water Management Plan in the future. Revisions are necessary to provide a Storm Water Management Plan that truly fits the needs and resources of the community. This balancing act will ultimately lead to more public education and involvement, and bring St. Joseph closer to its goal of minimizing storm water pollutant runoff to the maximum extent possible.

**Table 10: Summary of BMPs and Measurable Goals**

| Minimum Control | Best Management Practice | Measurable Goal | Implementation |
|---|---|---|---|
| 1 | **Household Hazardous Waste Collection** – *to provide residents with education on the importance of proper disposal of household hazardous waste and the availability of the program (in conjunction with Minimum Control 3)* | • Provide at least two (2) collections per year<br>• Issue press releases to media on availability<br>• Investigate providing collection program on a year round basis at municipal landfill | In Place<br>In Place<br>Partially in Place |
| | **Schools** – *to promote education of environmental and ecological issues including storm water pollution* | • Provide at least three (3) public speaking appearances to schools per year<br>• Investigate potential partnerships with school district and Missouri Western State College to provide educational materials and resources | In Progress<br>January 2008 |
| | **Brochures** – *to educate public on the impacts of storm water pollution* | • Develop and provide brochures each year to local businesses<br>• Develop and provide brochures addressing construction site storm water runoff each year to local hardware stores, home improvement, and lawn and garden centers (in conjunction with Minimum Control 4) | January 2008<br>January 2008 |
| | **Giveaways** – *to provide a succinct message on the impacts of storm water pollution* | • Develop and distribute giveaways | January 2008 |
| | **Media Relations** – *to utilize media to educate residents and promote storm water pollution prevention* | • Generate at least five (5) press releases per year for various publications.<br>• Promote Storm Water Management Plan on City website | In Progress<br>In Progress |
| 2 | **Storm Water Public Advisory Committee** – *to involve residents in the development of the Storm Water Management Plan* | • Discuss each minimum control with the committee<br>• Incorporate their suggestions and comments into the Storm Water Management Plan | Completed<br>In Progress |
| | **Community Wide Involvement** – *to promote involvement in the implementation of the Storm Water Management Plan* | • Develop a storm water impact project listing available for service organizations | June 2008 |
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| 3 | **Storm Sewer System Mapping** – *to indicate the location of outlets and natural channels to assist in dry weather screening* | • Develop electronic map of storm sewer system<br>• On going visual inspection of storm outfalls maintenance, projects and non-peak times | Completed<br>In Progress |
| | **Ordinance** – *to prohibit illicit discharges through ordinance as well as establishing enforcement procedures* | • Develop an ordinance prohibiting illicit discharges and the penalties for causing such discharges | Completed |
| | **Detection and Elimination of Illicit Discharges** – *to develop a program to detect illicit discharges to the MS4 and eliminate them* | • Document suspicious flows during yearly maintenance of inlet (dry weather screening)<br>• Document number of illicit discharge sources identified and eliminations of such discharges | October 2007<br>January 2008 |
| | **Education** – *to increase public awareness of the hazards of illicit discharges* | • Develop education brochure in conjunction with Minimum Control 1 | January 2008 |
| 4 | **Erosion Control Policy** – *to clearly establish what measures will be taken to prevent erosion and off site sediment during and after development* | • Document number of land disturbance permits issued each year | In Place |
| | **Sanctions** – *to establish a system of sanctions that are uniformly applied to all violations* | • 100% of permitted land disturbances inspected<br>• Document occurrence and severity of sanctions with goal of reducing occurrences from year to year | In Place<br>In Progress |
| | **Contractor Education** – *to educate contractors of the importance of erosion and sediment control, as well as proper installation and maintenance procedures* | • Provide annual training seminar for contractors and City inspectors | January 2008 |
| | **Public Education** – *to educate the general of the importance of erosion and sediment control, as well as provide potential sources to obtain temporary erosion products* | • Develop and provide brochures each year to local hardware stores, home improvement, and lawn and garden centers (in conjunction with Minimum Control 1) | January 2008 |
| | **Water Quality/Storm Water Hotline** – *to provide the public an avenue to provide input on water quality/storm water* | • Document number of calls received | January 2008 |
| 5 | **Storm Water Management Policy** – *to minimize and/or prevent water quality impacts from new development and redevelopment by using structural best management practices* | • Storm water management policy<br>• Revise storm water management policy to better address quality issues | In Place<br>2008 |
| | **Planning and Zoning** – *to minimize and/or prevent water quality impacts from new development and redevelopment by using non-structural best management practices* | • Develop policy to encourage urban core development<br>• Develop landscaping ordinance<br>• Suggest revisions to the Planning and Zoning Ordinances regarding committee recommendations. | In Place<br>In Place<br>March 2008 |
| | **Regional Detention Ponds** – | • Black Snake Creek Watershed | In Progress |

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|---|---|---|---|
| | *to minimize and/or prevent water quality impacts from existing development or smaller developments where detention basins are impractical* | regional detention basin<br>• Investigate other funding sources for additional regional basins<br>• Create action plan for the development of future regional basins | In Progress<br><br>In Progress |
| | **Deicing Practices** – *to minimize and/or prevent water quality impacts from municipal deicing practices* | • Refer to Minimum Control 6 – Pollution Prevention/Good Housekeeping for Municipal Operations | |
| | **Developer Education** – *to educate developers on the impacts of storm water pollution and prevention methods* | • Developer education is addressed in Minimum Control 1 – Public Education and Outreach on Storm Water Impacts | |
| 6 | **Training** – *to educate employees about specific pollution prevention/good housekeeping methods* | • Revise Operations and Maintenance Manual to include specific storm water pollution training and education<br>• Provide at least three (3) joint training programs per year between City and industry representatives | January 2008<br><br>January 2008 |
| | **Street Sweeping** – *to reduce the amount of floatables and other pollutants entering the MS4 and reduce future maintenance costs* | • Maintain street sweeping log with the goal of sweeping each street a minimum of four (4) times per year | In Place |
| | **Parking Lot and Garage Sweeping** – *to reduce the amount of floatables and other pollutants entering the MS4 and future maintenance costs* | • Maintain parking lot and garage sweeping log with the goal of sweeping each facility a minimum of four (4) times per year | In Place |
| | **Inlet Inspection, Cleaning and Maintenance** – *to reduce the amount of floatables and other pollutants entering the MS4 and reduce future maintenance costs* | • Maintain inlet inspection, cleaning, and maintenance log with the goal of inspecting, cleaning, and maintaining each inlet a minimum of one (1) time per year | In place |
| | **Snow and Ice Removal** – *to reduce the amount of salt used to treat roadways during winter weather events* | • Chart annual amount of salt used per year vs. winter weather frequency | In Place |